

PATENT COOPERATION TREATY

PCT


INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY PCT

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference WO436-7437003		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2004/014485		International filing date (day/month/year) 20.12.2004	Priority date (day/month/year) 15.01.2004	
International Patent Classification (IPC) or national classification and IPC INV. B01D3/26 B01D3/20 B01J8/04				
Applicant HALDOR TOPS E AS				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 1 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 27.05.2005		Date of completion of this report 13.04.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized officer Vlassis, M Telephone No. +31 70 340-4292		



**INTERNATIONAL PRELIMINARY REPORT
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-9 as originally filed

Claims, Numbers

1-5 as amended (together with any statement) under Art. 19 PCT

Drawings, Sheets

1/3-3/3 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☒ the claims, Nos. 1-5
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
- ☐ the entire international application,
 - ☐ claims Nos.
- because:
- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
 - ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
 - ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
 - ☐ no international search report has been established for the said claims Nos.
 - ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
 - ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
- ☒ See separate sheet for further details

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3,4
	No: Claims	1,2,5
Inventive step (IS)	Yes: Claims	
	No: Claims	1-5
Industrial applicability (IA)	Yes: Claims	1-5
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item III

1) The amendments filed by the applicant under Art.19 PCT are not considered to comply with the requirements of Art. 34(2)(b) PCT.

More particularly, no basis for the introduction of "one or two up-flow zones" and "so that each up-flow leg is non-concentric with respect to the down-flow leg" in claim 1 could be found in the application as originally filed, nor does the applicant indicate or argue any basis for such an amendment.

Additionally no basis for the introduction of "plate" in claim 5 could be found in the application as originally filed.

Therefore, the previous set of claims, containing the amendment "and a transition zone" will serve as basis for the International Preliminary Report on Patentability.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1,2 and 5 is not new in the sense of Article 33(2) PCT.

The document D1 discloses (see paragraphs 32-34 and figures 2A-6, the references in parentheses applying to this document) a liquid-vapour distribution device for use in two-phase concurrent down-flow vessels, comprising a level, horizontal tray being perforated with holes, each perforation through the horizontal tray being fitted with a vapour lift tube (see risers 120,220,320,420), the vapour lift tube consists of at least one elongated up-flow leg and one down-flow leg creating at least one up-flow zone (see 180, 280) and a down-flow zone (see 190, 290) and a bluff body arranged within the transition zone (see swirl directors 150) and in the up-flow region (see dividers 140, 240 and 280). At least the swirl directors act as impingement surfaces.

The subject-matter of claims 1 and 5 is therefore not novel in view of D1.

The document D2 discloses (see paragraphs col.4, line 50-col.5, line 12, col.5, line 54-

col.6, line 26 and figures 1-4, the references in parentheses applying to this document) a liquid-vapour distribution device for use in two-phase concurrent down-flow vessels, comprising a level, horizontal tray (see 30,130) being perforated with holes, each perforation through the horizontal tray being fitted with a vapour lift tube (see riser 112), the vapour lift tube consists of at least one elongated up-flow leg and one down-flow leg creating at least one up-flow zone and a down-flow zone and a bluff body arranged within the transition zone (see spacers 116) and in the down-flow region (see retainer 118 and dispersion plate 158). At least the spacers act as impingement surfaces.

The subject-matter of claims 1 and 5 is therefore not novel in view of D2.

The document D3 discloses (see figures 1-3, the references in parentheses applying to this document) a liquid-vapour distribution device suitable for being used in two-phase concurrent down-flow vessels, comprising a level, horizontal tray (see col.1, lines 11-14) being perforated with holes, each perforation through the horizontal tray being fitted with a vapour lift tube (see cylindrical sleeve 2), the vapour lift tube consists of at least one elongated up-flow leg and one down-flow leg creating at least one up-flow zone and a down-flow zone and a bluff body arranged within the transition zone (see deflector members 5 and bracket lug members 6). The deflector member is formed as a guide vane curving towards the legs of the vapour lift tube.

The subject-matter of claims 1 and 2 is therefore not novel in view of D3.

3) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 3 and 4 does not involve an inventive step in the sense of Article 33(3) PCT.

The document D1 is regarded as being the closest prior art to the subject-matter of claims 3 and 4. The subject-matter of claims 3 and 4 differs from this known distributor in that the bluff body is not formed as a fairing.

The problem to be solved by said difference is seen to be the improvement of the movement of the fluid from the up-flow zone to the down-flow zone without creating considerable flow resistance, thus improving the flow stability.

In D1 said problem is already solved by providing swirl directors and dividers in the fluid

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flow path. Since no additional advantages are disclosed in the present application, the shaping of the bluff body as fairings is therefore only regarded as an obvious alternative to the bluff body already disclosed in D1.

Therefore, the subject-matter of present claims 3 and 4 is not regarded as involving an inventive step, in view of D1.

Replacement Page 10 ~~11~~**New Claims**

1. A liquid-vapour distribution device for use in two-phase concurrent down-flow vessels, comprising: a level, horizontal tray being perforated with holes, each perforation through the horizontal tray being fitted with a vapour lift tube, the vapour lift tube consists of at least one elongated up-flow leg and one down-flow leg creating one or two up-flow zones, a down-flow zone and a transition zone between the up and down-flow zones, the one or two up-flow legs of the vapour lift tube are fitted along the down-flow leg so that each up-flow leg is non-concentric with respect to the down-flow leg, the improvement of which comprises a bluff body being arranged within the transition zone and/or in a region of the up-flow or down-flow zone adjacent to the transition zone of the vapour lift tube.
2. The liquid-vapour distribution device of claim 1, wherein the bluff body is formed as a guide vane curving towards the legs of the vapour lift tube.
3. The liquid-vapour distribution device of claim 1, wherein the bluff body is formed as a fairing.
4. The liquid-vapour distribution device of claim 3, wherein one or more fairings are arranged on the down-flow leg adjacent to the transition zone of the tube.
5. The liquid-vapour distribution device of claim 1, wherein the bluff body is formed as an impingement plate